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ABSTRACT

This paper provides a description of an online Rorschach interpretation algorithm for the Exner comprehensive system, as well as a study conducted to evaluate the validity of the online interpretive algorithm. The user, systems, and equipment specifications for the algorithm are explained, and the potential advantages of its use to enhance clinical efficiency and clinician skill in decision making are discussed. The validity of the online interpretation was tested by asking two expert clinicians to compare the computerized output with the structural interpretation used in the text for 10 sets of Rorschach reports. The computer-generated narratives were found to be as useful as clinician reports in four of the six characteristics reported, and possible solutions to the problems with the remaining two dimensions are suggested. Sixteen references are cited. (MER)

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COMPUTERIZED INTERPRETIVE APPROACH FOR THE EXNER COMPREHENSIVE RORSCHACH SYSTEM

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ABSTRACT

In this paper the construction of an on-line Rorschach interpretation algorithm for the Exner comprehensive system is described. The description of the algorithm includes an explanation of the user, systems, and equipment specifications. A study to evaluate the validity of the on-line interpretive algorithm is also reported. The results suggest that the computer-generated narratives possess report characteristics that are important in clinical decision-making. Weaknesses in the algorithm are discussed.

COMPUTERIZED INTERPRETIVE APPROACH FOR THE EXNER COMPREHENSIVE RORSCHACH SYSTEM

Two of the most important achievements to occur in the area of personality assessment during the seventies were the use of on-line computer technology and the introduction of the Exner Comprehensive Rorschach System (1974). These achievements have lead to improvement in the delivery of mental health services.

The use of the computer in personality assessment has been largely limited to nonprojective measures. These instruments have generally included standardized procedures for administration and scoring, and prespecified rules for interpretation of test data (Johnson & Williams, 1975). Projective personality measures have been considered to be both clinically and economically less desirable to fully automate. Some of the problems involved in the computerization of projective measures have been their lack of a unitary scoring and interpretation procedure.

However, efforts to automate projective assessment techniques have been made. Veldman (1967) and Veldman, Menaker, and Peck (1969), using a sentence completion test, designed an automated interpretive system. Smith (1968) constructed a computer generated method for the TAT. Gorham (1967) developed a computer-scoring system for the Holtzman inkblot technique. Perhaps the most noted computer-assisted interpretation approach in this area has been Piotrowski's perceptanalysis Rorschach system (1974). Since its introduction the computerized percept-

analysis system (currently known as the Piotrowski Automated Rorschach or PAR) has undergone three major revisions and has more than 900 rules (Piotrowski, 1980). A salient problem for the PAR has been its underutilization by clinicians. Exner (1976) reported in a recent survey of Rorschach practitioners that few psychologists are well-trained in the Piotrowski method of Rorschach analysis. Nevertheless, the PAR has shown that the Rorschach technique can be adapted to the computer.

A serious problem with the use of the Rorschach method has been the proliferation of systems to interpret Rorschach projective data. The growth of "personal" systems has increased the complexity of this assessment tool while concurrently undermining it utility in clinical decisions. These problems and the inefficient method of processing the data led Knudson (1972) to predict the demise of the Rorschach technique.

Although this projective method has lost some ground to the objective assessment procedures, the introduction of the Exner comprehensive system was a key force in the revitalization of Rorschach Psychology (Klopfer & Taulbee, 1974). Several factors were responsible for the renewed interest in the Rorschach method and in the comprehensive system. First, the comprehensive system was developed with more attention given to the psychometric property of its determinants, ratios, and formulae. In most cases, the inclusion of a parameter into the comprehensive system can be explained both in terms of theory and empirical evidence. Secondly, the comprehensive system can be described as the best approximation of a unitary Rorschach approach. Specific

features from the five major Rorschach systems that are important to the interpretation of the data and are supported empirically have been included in the comprehensive system. Thirdly, the structural nature of the data has been the heart of the analysis and interpretation process. The structural characteristics of the Rorschach response represent the least subjective level and the most reliable level on which to analyze and interpret the data. Another related factor has been the delineation of rules to be used in the structural analysis. These rules have enhanced the comprehensive system's usefulness by increasing its interpretability and by making the data analysis more efficient.

The purpose of this paper is to describe the development of an on-line interpretive algorithm for the comprehensive system. The potential advantages of such an algorithm are that it can enhance clinical efficiency, aid the clinician in decision-making, and improve the delivery of mental health care. In addition to describing the construction of the on-line system, the results of a study to determine the validity of the algorithm and the usefulness of the computer-derived narratives will be reported.

CONSTRUCTION OF AN ON-LINE SYSTEM

The Exner comprehensive system use of explicit rules in the data analysis prompted the present author to develop an on-line computer interpretation and report algorithm. In developing the algorithm, the interpretive rules for conducting a structural analysis were identified from works published on the comprehensive system. For each rule, three interpretive statements were included to provide a more diversified report and to reduce redundancy. Researchers in the area of automated clinical methods have frequently noted that resistance from clinicians is partially due to nomothetic emphasis of computer-derived reports. Although the information may be clinically useful, it can quickly becoming boring to the reader. The present on-line computer system has a dictionary with 400 statements for its 150 interpretive rules.

Functional Specifications

A trained clinician administers and scores the Rorschach protocol. The person who enters the data into the computer can be a non-clinical staff member. The user sits in front of the cathode-ray tube terminal (CRT) and interacts with the computer through the CRT.

Once the computer has been promted, the user can develop a data file for the subject by entering his/her identification number (e.g. social security number). The user then inputs pertinent demographic information about the person such as age, gender, educational level, marital and employment status.

Other information including the purpose of the assessment and the level of cooperation of the subject are entered into the computer system. At this point, inspection of the data through the CRT occurs. This inspection is prompted by the question, "Are the data correct (Y/N)?" If errors are detected the user presses "N" to the question. If no errors are detected the user presses the "Y" key. Next the user enters into the computer system data from the Rorschach protocol. The stored information consists of determinants, content categories, location features, developmental quality, form quality, and special scorings. This information is used to calculate the ratios, percentages, and derivations that are needed for the structural analysis. The total number of variables stored is 109. Novice users require between 3 to 5 minutes to enter a protocol into the computer system. After the data have been entered and free of errors, the users presses the "Y" key to prompt the question, "Were the data entered correctly (Y/N)?" Pressing the "Y" key initiates the permanent storage of the data on the user's floppy disk. A second question then appears on the video display, "Would you like the data analyzed (Y/N)?" An affirmative response starts the analysis of the data. A non-affirmative response results in the storage of the data without analysis. However, the data analysis can be conducted anytime later, at the discretion of the user.

Systems Specifications

The systems specifications describe the computer adaptation of the algorithm for on-line interpretive reporting. The Ror-

schach data are used by the computer system to compute the ratios, percentages, and derivations of the structural summary. This information along with other aspects of the data are then examined to determine which prespecified rules are met. One of the three comparable interpretive statements is randomly selected for inclusion in the narrative. On completion of the data analysis, the statements comprising the report are sent to the line printer in the sequence that they are to be printed.

Equipment Specifications

The equipment specifications were a DEC 11/03 micro-computer with 32k memory, a VT 100 CRT, a Diablo printer, and 2 DEC floppy disk drives. All programming was completed in Multi-user Basic program language. The exportability of Basic was a factor in its selection. In designing the software, one floppy disk was used for the algorithm and the other disk for subject data. The former disk contained the format for storing the subject data, the prespecified rules, the dictionary of interpretive statements, and the logic for calculating the various formulae and derivations of the structural analysis. The user's disk or subject data disk was designed to store the raw data of each protocol. Retrieval of data files was readily accomplished since each data file is identified by a unique numerical code. All tasks performed by the computer system were in a single job mode.

Output

Figure 1 is an example of the computer-generated Rorschach report. In most instances, the computer-derived narrative describes the cognitive processes, emotional state, interpersonal

quality, and defense mechanisms commonly used by the assessed person. These areas of psychological functioning are considered valuable in understanding the person and making clinical decisions (Beck, Beck, Levitt, & Molish, 1961). In addition to this salient information, key clinical symptoms and possible diagnosis are suggested.

VALIDITY STUDY

The clinical value of the computer-generated report depends partially on whether clinicians consider the report useful in understanding and treating the individual. The extent to which the report meets these criteria is an indicator of the validity of the algorithm. In this section of the paper a study comparing the computerized output with the report of an expert clinician is described.

Method

Two doctorate-level clinicians who were experienced as psychodiangosticians were asked to judge the clinical value of 10 sets of Rorschach reports. The reports were derived from examples given by Exner (1974, 1978). Each set consisted of the structural interpretation used in the text and its computer-generated counterpart.

A 13 item, agree-disagree questionnaire was constructed to compare the computer-derived and clinician-derived reports. The 13 item questionnaire compared the reports on dimensions that many psychodiagnosticians consider basic to a clinically useable report (Schafer, 1954; Weiner, 1972). Dimensions used in the comparison included: (1) diagnostic understanding, (2) treat-

ment planning, (3) psychological state, (4) trait characteristics, (5) personality structure, (6) current psychopathology, (7) adaptive capabilities, (8) interpersonal characteristics, (9) cognitive processes, (10) defense mechanisms, (11) idiographaic information, (12) free of contradictions, and (13) clarity/conciseness. To reduce the possibility of an order effect occuring in the judges' response patterns the reports in each set were counterbalanced. For five of the sets, Report A referred to the computer-generated report; in the other five cases, it referred to the clinician-generated report.

However, for analysis purpose the data were recorded in a single direction, to enable agreement among judges to be measured. Interjudge reliability was then computed, using the Kappa statistic (Cohen, 1960). The Kappa statistic calculates nominal agreement while correcting for chance agreement.

Results and Conclusions

A k=.27 for all observed decisions for the 10 sets of Rorschach reports was obtained. This result was significantly greater than zero ($p<.001$). The examination of the judges' agreement for each of the 13 items resulted in significant kappa values for six of the report characteristics. A mean k=.62 ($p<.01$) was found for the six kappa values. In these cases the judges considered the computer-generated reports to be as good as the clinician reports in describing the psychological state, the cognitive processes, the fantasy life, and defense mechanisms of the individual. The judges also found the computer-generated

reports to be as useful as the clinician reports in developing a diagnostic impression of the person and in formulating a treatment plan. Statistically nonsignificant kappa values were obtained on the remaining dimensions.

Although the findings are preliminary, they suggest that the computer algorithm used to analyze the Rorschach data and to generate the reports is valid. These findings further indicate that the comprehensive system is amenable to automation. There are indications that the algorithm does not provide an adequate description of the person's idiography. Also, the judges report that some contradictory information was contained in some of the computer-generated narratives. These problems, although central to clinician's resistance to computer applications of psychological assessment tools, are not insurmountable. Modifying the computer algorithm to include a more thorough analysis of the content of the Rorschach protocol should improve the idiographic quality of the report. Increasing the algorithm's effectiveness to check the compatability of the interpretive statements should reduce the liklihood of contradictory statements in the computer-generated narrative. Although the computerized narrative has several problems, refinement and expansion of the rules and interpretive statements should eliminate these weaknesses.

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A.B. is a 28 year old single female. She reports completion of a two year junior college program and is currently employed as a teacher. Her level of cooperation during testing was excellent.

Individuals such as this respond to testing with an intellectual approach that is sufficient to the task. She makes use of an appropriate amount details and generalities in response to the cards. She tends to be an underachiever. Such individuals lack the ability to adequately test reality in their day to day operations. Under stress, her thinking becomes excessively rigid and constricted.

Individuals such as this have substantial psychological resources which are well organized and accessible. Such people are not able to control affective displays when appropriate. Labile emotions can be expected. Individuals such as this tend to avoid situations that are emotionally laden. She is apt to withdraw from the world under emotional pressure. This individual has significant feelings of helplessness but does have the capacity to cope.

This person is basically introverted and suffers from low self-esteem. There is an indication of self-introspection. These are unconventional people. Others often see them as negative, contrary, and oppositional.

Defense mechanisms include denial and intellectualization. The individual seems to be experiencing increasing defensive and adaptive failure.

Possible clinical symptoms include depression. The clinician should check for possible suicide intention.

Possible diagnosis is depressive reaction.

Figure 1. An example of a computer-generated Rorschach report.